

Subsidizing solar power manufacturers is no guarantee of success

*In the early 2000s, as part of an effort to reduce greenhouse gas emissions, many US states and cities expanded subsidies for solar power manufacturers, which led to a growing industry. But by the early 2010s, many previously successful companies had gone bankrupt. **Joan Fitzgerald** writes that these companies were largely undercut by China's solar industry which dumped its products on the world market at below-cost prices. Rather than providing subsidies, she argues, cities and states should promote solar adoption through power purchase agreements, renewable energy zones and community generation.*



In my book *Emerald Cities*, I wrote enthusiastically about the connections that cities were making between sustainability and economic development—transforming building materials suppliers into green building suppliers and producing streetcars and electric vehicles and biodiesel among others. Many of the examples were in renewable energy, particularly photovoltaic (PV) solar panel production.

The story started in Freiburg—one of several cities whose policies were replicated at the federal level to make Germany a powerhouse of solar production. Solar Fabrik was Freiburg's first homegrown solar company. The zero-emissions plant opened in 1999. But weak demand, price pressure and discovery of faulty junction boxes in several of its product lines did the company in. By June 2015 it closed operations.

An unlikely story I told was of two solar manufacturers in Toledo, Ohio spun off from research at the University of Toledo. When First Solar opened its first factory in nearby Perrysville in 2004, it was the country's largest solar panel producer. After some rocky times, First Solar has remained in the top ten of solar PV producers.

Another success out of Toledo was Xunlight—a thin film solar company started by a University of Toledo physics professor and his wife in 2002. With \$3 million in startup funds from the university's Innovation Enterprises, \$2 million in state and local tax credits and a \$4 million state loan, the company began producing its flexible stainless steel solar cells. The *Toledo Blade* reports that Xunlight received \$34.5 million in tax credits from the stimulus in 2010 in addition to a \$3 million grant from the National Institute of Standards and Technology.

In 2007, Xunlight raised \$7 million in financing followed by another \$22 million from major technology investment firms. It seemed on track to becoming an international leader in thin-film flexible solar modules. In 2010 Xunlight invested \$2 million to open a production facility in Kunshan. The idea, or so CEO Deng said, was to assemble panels at a lower cost while expanding the Toledo plant. Two years later the plant was sold. By the end of 2014, Xunlight filed for Chapter 7 bankruptcy and closed all operations.



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And in my home state, Massachusetts, Evergreen Solar was the darling of the solar industry. Started in 1994, Evergreen expanded in 2008 into a \$450 million facility in Devens, outside Boston. With more than \$50 million in various state and local subsidies and land deals, Evergreen's claim to fame was its patented string ribbon technology that used considerably less silicon than other panels. By August, 2011 it had filed for Chapter 11 bankruptcy and sold its assets to pay off hundreds of millions of dollars to its creditors.

What happened? How could these promising companies go bankrupt when worldwide solar installations are growing? The answer is China. With its explicit industrial policy, and state-subsidized production, and discrimination against imports, China is playing by its own rules and demolishing other nations' efforts, even as it depends on their imports of its products.

China's first big push in solar was an investment of \$221 billion in renewable energy development as part of a stimulus package in 2009. This investment would help China meet a goal established in 2007 for large utilities to produce 3 percent of their power from renewable sources by 2010 and 8 percent by 2020, excluding hydroelectric. The five-year plan that started in 2011 originally had a goal of producing 5 gigawatts of solar energy, which was increased several times. A 2015 goal of adding 17.8 gigawatts was exceeded by 20 percent. The plan covering 2016-2020 calls for 100 gigawatts. But growth in the China market is not the whole story. To establish a solar industry, China offered huge subsidies and free land to US and German solar companies to locate there. The only stipulation is that they couldn't sell their products in China. This happens to violate trade law, but the US did not make an issue of it. Then China started developing its own solar industry and dumping products on the world market at below-cost prices—something that also violates trade law. The strategy has been very effective—in 2015 six of the top ten PV producers were Chinese and another, Canadian, now produces mainly in China. Two US companies, SunPower and First Solar, made the list. China's solar producers are building huge solar farms to meet the renewable goals of the five-year plans.

So, back to First Solar. It is still a small success story for the Toledo area—the original plant is still operating. After building the Perrysville plant, the company built plants in Malaysia and Germany. Then in 2011 First Solar announced that it was building a \$300million factory in Mesa, Arizona. State and city subsidies of about \$51.5 million were offered for the facility, which would employ 600 to produce 250 MW of thin film modules per year. But in

2012 First Solar had to abandon its global expansion plans due to the glut of solar panels in world market—dramatically dropping prices. In May 2012, First Solar announced 2,000 layoffs, or 30 percent of its global workforce. The facility in Germany was closed and four production lines in Malaysia were idled. Even though the Mesa plant was nearly complete, First Solar began seeking a tenant for the plant in October 2012.

First Solar has survived those troubled times and is the world's sixth largest PV panel producer in 2015. As for Arizona, the subsidies were never applied since the building wasn't occupied. And in 2013, Apple bought the building to make high-tech glass for its products. But this didn't work out because Apple's partner in the venture, GT filed for bankruptcy in 2014. The good news for Mesa is that Apple is now going to use the facility as a data center.

All this to say that the solar industry is quite volatile and that cities and states that offer subsidies are going to lose more than they win.

So what can cities do to promote solar adoption? Make permitting solar projects easier. Enter into power purchase agreements. Define renewable energy zones. Promote community solar. These actions can help cities reduce their GHG emissions and have many co-benefits as well. They are a far better bet than subsidizing solar manufacturers.

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Joan Fitzgerald is a Professor in the School of Public Policy and Urban Affairs at Northeastern University. Her research focuses on urban climate governance and the connections between urban sustainability and economic development and innovation. Her third book, *Emerald Cities: Urban Sustainability and Economic Development* (Oxford Univ. Press), examines how cities are creating economic development opportunities in several green sectors and discusses the state and national policy needed to support these efforts. Emerald Cities builds on her 2002 book, *Economic Revitalization: Strategies and Cases for City and Suburb* (Sage), which identifies strategies for incorporating sustainability and social justice goals into urban economic development planning. In 2012 she published a three-volume anthology, *Cities and Sustainability*.



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